PATENT COOPERATION TREATY

From the

To:
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25 JUL 2007
FILE No. 2007
G.E. EHRLICH (1995) Date

PCI

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

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(PCT Rule 7i.1)

Date of mailing (day/month/year)

17 JUI 2007

Applicant's or agent's file reference

29081

IMPORTANT NOTIFICATION

International application No. International filing date (day/month/year)

Priority date (day/month/year)

PCT/IL05/00166

10 February 2005 (10.02.2005)

30 May 2004 (30.05.2004)

Applicant

KORNIT DIGITAL LTD.

- 1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
- 2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
- 3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/ US

Mail Stop PCT, Attn: IPEA/US

Commissioner for Patents P.O. Box 1450

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Form PCT/IPEA/416 (January 2004)

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	J	See Form DCT/IDE A /416	
29081	FORFURINERACTOR		See Form PCT/IPEA/416	
International application No.	International filing date (day/m	nonth/year)	Priority date (day/month/year)	
PCT/IL05/00166	10 February 2005 (10.02,2005)		30 May 2004 (30.05.2004)	
International Patent Classification (IPC)	or national classification and IPC	•		
IPC: B41J 23/00, 2/01; G03B 27/32, USPC: 347/37,104,102; 355/53 Applicant	42	······································		
KORNIT DIGITAL LTD.				
i -	ional preliminary examination of the control of the	1 -	shed by this International Preliminary cording to Article 36.	
2. This REPORT consists of	a total of H sheets, including	this cover sheet.		
3. This report is also accompa	anied by ANNEXES, compris	sing:		
a. [] (sent to the applica	nt and to the International Bu	ureau) a total of _	sheets, as follows:	
this report ar		ications authorize	ve been amended and are the basis of ed by this Authority (see Rule 70.16	
that goes bey			rity considers contain an amendment ion as filed, as indicated in item 4 of	
, containin	g a sequence listing and/or Supplemental Box Relatin	tables related t	nd number of electronic carrier(s)) hereto, in electronic form only, as Listing (see Section 802 of the	
4. This report contains indica	ions relating to the following	items:		
Box No. I Ba	sis of the report			
Box No. II Pri	ority			
	n-establishment of opinion w. olicability	ith regard to nove	elty, inventive step and industrial	
	ck of unity of invention			
	regard to novelty, inventive step or supporting such statement			
	tain documents cited	and expitations	supporting such statement	
Box No. VII Ce	tain defects in the internation	al application		
Box No. VIII Cer	tain observations on the inter	national applicati	on	
Date of submission of the demand	Date	e of completion o	f this report	
09 April 2007 (09.04.2007)	21.1	una 2007/21/06/20	^~\	
Name and mailing address of the IPEA/ U	S Auth	une 2007 (21.06.20 norized officer 🏻 🖓	, , , , , , , , , , , , , , , , , , ,	
Mail Stop PCT, Attn: IPEA/US		TOTIZOG OTHOCH (C)	ronda fall	
Commissioner for Patents P.O. Box 1450	STE	EPHEN D MEIER		
Alexandria, Virginia 22313-1450	Teler	phone No. (571)27	/2-1562	
Facsimite No. (571) 273-3201 Form PCT/IPEA/409 (cover sheet)(April 20		, (2 / 2/2)		

International application No.	
PCT/IL05/00166	

Bo	x No.	I Ba	sis of the report	
1.	With	regard	to the language, this report is based on:	
	\boxtimes	the inte	ernational application in the language in which it was filed.	
		a transi purpos	lation of the international application into, which is the language of a translatices of:	on furnished for the
		iı	nternational search (under Rules 12.3 and 23.1(b))	
		p	sublication of the international application (under Rule 12.4(a))	
		ir	nternational preliminary examination (under Rules 55.2(a) and/or 55.3(a))	
2.	to the	receivir	the elements of the international application, this report is based on (replacement sheets which on the second of the internation application of the second	
	\boxtimes	the inte	ernational application as originally filed/furnished	
	\boxtimes		scription:	
			1-19 as originally filed/furnished NONE received by this Authority on	
			NONE received by this Authority on	
	\square	the clai	i1135'	
			20-30 as originally filed/furnished	
		-	NONE as amended (together with any statement) under Article 19	
		pages*	NONE received by this Authority on	
		pages*	NONE received by this Authority on	
	\boxtimes	the dra	wings:	
		pages	as originally filed/furnished	
		. •	NONE received by this Authority on	
		pages*	NONE received by this Authority on	
		a seque	ence listing and/or any related table(s) - see Supplemental Box Relating to Sequence I	Listing.
3.		The an	nendments have resulted in the cancellation of:	
			the description, pages	
			the claims, Nos.	
			the drawings, sheets/figs	
			the sequence listing (specify):	
			any table(s) related to the sequence listing (specify):	
4.		-	oort has been established as if (some of) the amendments annexed to this report and listed below ey have been considered to go beyond the disclosure as filed, as indicated in the Supplemental l	
			the description, pages	
			the claims, Nos.	
		 1	the drawings, sheets/figs	
			the sequence listing (specify):	;
			any table(s) related to the sequence listing (specify):	,
		<u></u>	any anorogy rotated to the sequence name (opechy).	
* Ij	fitem	4 appli	es. some or all of those sheets may be marked "superseded."	

Form PCT/IPEA/409 (Box No. I) (April 2005)

Form PCT/IPEA/409 (Box No. V) (April 2005)

International application No. PCT/IL05/00166

Claims 1-81	Claims 1-81 NO Inventive Step (IS) Claims NONE YES Claims 1-81 NO Industrial Applicability (IA) Claims 1-81 YES Claims NONE NO Citations and Explanations (Rule 70.7) ase See Continuation Sheet	tatement			
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		e gee Communication Sheet			

International application No.

PCT/IL05/00166

Box No. VI Certain do	cuments cited		
1. Certain published docum	nents (Rule 70.10)		
Application No	Publication Date	Filing Date	Priority date (valid claim)
Patent No.	(day/month/year)	(day/month/year)	(day/month/year)

22/11/2002 US 2003/0142167 A1 31/07/2003 28/11/2001 25/11/1996 26/05/1996 US 5757407 06/06/2000 US 6536894 25/03/2003 21/11/2001 30/08/2001 29/06/2004 US 6755518 22/04/2003 23/04/2002 23/10/2003 US 2003/0197772

2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure

Date of non-written disclosure (day/month/year)

Date of written disclosure referring to non-written disclosure (day/month/year)

International application No. PCT/IL05/00166

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In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Supplemental Box

1. Claims 13-19, 32-81 lack an inventive step under PCT Article 33(3) as being obvious over Iwatsuki et al. (US 2003/0197772 A1) in view of Codos (US 6755518) and Rasmussen et al. (US 6536894).

Iwatsuki et al. discloses a printing machine comprising:

a rigid frame (FIG. 1, element 1);

a linear motion X axis stage (FIG. 1, elements 11, 11a-b) mounted on said frame;

a printing table assembly (FIG. 1, elements 12, 13, 15) movable on said linear X axis stage (FIG. 1: The stage 11 linearly moves from FRONT SIDE to REAR SIDE and versa);

a linear motion Y axis stage (FIG. I, elements 2-4) mounted on said frame perpendicular to said linear X axis stage, above said printing table assembly (FIG. 1: The carriage 4 moves along a direction perpendicular to the moving direction of printing table assembly 11);

an array of inkjet nozzles (FIG. 1, element 5 and paragraph [0066]: The printing head 5 has a phirality of nozzles) mounted on said linear Y axis stage for linear motion perpendicular to said X axis stage (FIG. 1: The carriage 4 moves the printhead 4 across the printing table assembly).

Iwatsuki et al., however, does not teach a curing unit located above said printing table assembly and arranged to cure ink on media on said printing assembly, wherein said curing unit is an infrared system or a hot air blowing unit and wherein at least part of said printing table assembly is a vacuum table.

Codos discloses an ink jet printing apparatus mounted on a rigid frame (FIG. 1, element 11) and including an ink jet printhead assembly (FIG. 1, element 125) for forming images on a printing medium (FIG. 1, element 15) conveyed by a vacuum conveyor (FIG. 1, element 105, 121) and a curing unit located above the printing medium to cure ink deposited on

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Supplemental Box

the printing medium, wherein said curing unit is an infrared system or a hot air blowing unit (FIG. 1, elements 124, 126; column 8, lines 62-64: Heating by forced hot air is preferred, although other heat sources, such as infrared heaters can be used).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus to include a curing unit to cure ink deposited on the printing medium as disclosed by Codos. The motivation for doing so would have been to cure the ink upon its contacting the substrate (printing medium) to prevent ink spreading and wicking that affect printing quality as taught by Codos (*column 2*, *lines 65-67*). In addition, Iwatsuki et al. does not teach an ironing unit located above said printing table assembly and arranged to iron media on said printing assembly before printing thereon.

Rasmussen et al. discloses an ink jet printing apparatus including an ink jet printhead (FIG. 2B, element 14) for forming images on a printing medium conveyed by a conveyor (32) and an ironing unit located above said printing medium and arranged to iron said printing media before printing thereon (FIG. 2B, elements 201', 202; column 3, lines 32-38: Heating and pressing the print media upstream of printing to flatten print media prior to ink jet printing thereon).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus to include an ironing unit located above the printing medium to iron the printing media before printing as disclosed by Rasmussen et al. The motivation for doing so would have been to provide a flat and stable media for printing in order to improve image quality as taught by Rasmussen et al. (column 4, lines 19-24).

Iwatsuki et al. also teaches the following claimed invention:

wherein said printing table assembly comprises a media-holding plate (FIG. 5A-D, element 15) and an openable cover (FIG. 1, element 14) pivotally coupled to said media-holding plate for holding said media firmly against said plate (FIG. 5A-D).

wherein said media-holding plate (FIG. 5A-D, element 15) includes a raised portion (FIG. 5A-D, element 12), and said cover includes a window (FIG. 5A-D: The window is defined by the inner frame 19 of the frame structure (cover) 14) of the same shape and slightly larger than said raised portion (FIG. 5A-D, elements 12 and 19: The width of the inner frame (window) 19 is slightly wider than that of the raise portion 12).

wherein said printing table assembly is a flattened plate (FIG. 5A-D, elements 12-13 and 15).

2. Claims 20-21 lack an inventive step under PCT Article 33(3) as being obvious over Iwatsuki et al. (US 2003/0197772 A1) in view of Codos (US 6755518) and Rasmussen et al. (US 6536894), as applied to claim 13, and further in view of Rezanka (US 5757407).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above and also teaches wherein the printhead includes inkjet nozzles, but is silent wherein said inkjet nozzles include drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles.

Rezanka discloses an ink jet printing apparatus comprising ink jet nozzles including either drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles (column 12, lines 10-13) for ejecting ink droplets to form images on a printing medium.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to structure the inkjet printhead in Iwatsuki et al.'s printing apparatus (as modified) to include either drop-on-demand piezoelectric inkjet nozzles for ejecting ink droplets to form images on a printing medium as disclosed by Rezanka. The motivation for doing so would have been well known in the art that because drop-on-demand or continuous piezoelectric ink jet nozzles do not produce heat during ink ejection like thermal inkjet nozzles so the ink ejection is more stable due to less variation in term of the temperature than that in case of thermal inkjet nozzles.

3. Claims 1-3, 22, 27-28 lack an inventive step under PCT Article 33(3) as being obvious over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378).

Iwatsuki et al. discloses a printing machine comprising:

a rigid frame (FIG. 1, element 1);

a first linear motion X axis stage (FIG. 1, elements 11, 11a-b) mounted on said frame;

a first printing table assembly (FIG. 1, elements 12, 13, 15) movable on said linear X axis stage (FIG. 1: The stage 11 linearly moves from FRONT SIDE to REAR SIDE and versa);

a linear motion Y axis stage (FIG. 1, elements 2-4) mounted on said frame perpendicular to said linear X axis stage, above said printing table assembly (FIG. 1: The carriage 4 moves along a direction perpendicular to the moving direction of printing table assembly 11);

an array of inkjet nozzles (FIG. 1, element 5 and paragraph [0066]: The printing head 5 has a plurality of nozzles) mounted on said linear Y axis stage for linear motion perpendicular to said X axis stage (FIG. 1: The carriage 4 moves the printhead 4 across the printing table assembly).

Iwatsuki et al., however, does not teach a second linear motion X axis stage mounted on said frame parallel to said first axis stage, and arranged for operation independently of said first axis stage or a second printing table assembly

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movable on said linear X axis stage base independently of said first printing table assembly.

Morita et al. discloses an image forming apparatus for forming a pattern on each of at least two workpieces positioned on associated linearly movable support tables/stages, wherein the linearly movable support tables/stages (FIG. 6, elements 10, 20) are mounted on the same frame (FIG. 6, element 5), being parallel, and arranged for independently operation (FIG. 6: The two tables 10, 20 move along the parallel directions L1 and L2 and each having independent function at a time).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus to include a second table/stage that is parallel and independently operates from the first table/stage as disclosed by Morita et al. The motivation for doing so would have been to be able to alternatively transfer the tables between a load/unload position and an image/pattern forming position and alternatively form images/patterns on the tables so at least two workpieces can be processed simultaneously in order to increase the throughput of the apparatus as taught by Morita et al. (column 3, lines 45-59).

Iwatsuki et al. also teaches the following claimed invention:

wherein said printing table assembly comprises a media-holding plate (FIG. 5A-D, element 15) and an openable cover (FIG. 1, element 14) pivotally coupled to said media-holding plate for holding said media firmly against said plate (FIG. 5A-D).

wherein said media-holding plate (FIG. 5A-D, element 15) includes a raised portion (FIG. 5A-D, element 12), and said cover includes a window (FIG. 5A-D: The window is defined by the inner frame 19 of the frame structure (cover) 14) of the same shape and slightly larger than said raised portion (FIG. 5A-D, elements 12 and 19: The width of the inner frame (window) 19 is slightly wider than that of the raise portion 12).

4. Claims 7-8. 30-31 lack an inventive step under PCT Article 33(3) as being obvious over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claims 1 and 22, and further in view of Rezanka (US 5757407).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above and also teaches wherein the printhead includes inkjet nozzles, but is silent wherein said inkjet nozzles include drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles.

Rezanka discloses an ink jet printing apparatus comprising ink jet nozzles including either drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles (column 12, lines 10-13) for ejecting ink droplets to form images on a printing medium.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to structure the inkjet printhead in Iwatsuki et al.'s printing apparatus (as modified) to include either drop-on-demand piezoelectric inkjet nozzles or continuous piezoelectric inkjet nozzles for ejecting ink droplets to form images on a printing medium as disclosed by Rezanka. The motivation for doing so would have been well known in the art that because drop-on-demand or continuous piezoelectric ink jet nozzles do not produce heat during ink ejection like thermal inkjet nozzles so the ink ejection is more stable due to less variation in term of the temperature than that in case of thermal inkjet nozzles.

5. Claims 6, 9-11, 24-26, and 29 lack an inventive step under PCT Article 33(3) as being obvious over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claims 1 and 22, and further in view of Codos (US 6755518).

Iwatsuki et al.. as modified, discloses the claimed invention as discussed above except a curing unit located above each said printing table assembly and arranged to cure ink on media on said printing assembly, wherein said curing unit is an infrared system or a hot air blowing unit, and wherein at least part of said printing table assembly is a vacuum table.

Codos discloses an ink jet printing apparatus including an ink jet printhead (FIG. 1, element 125) for forming images on a printing medium (FIG. 1, elements 15) conveyed by a vacuum conveyor (FIG, 1, element 105, 121) and a curing unit located above the printing medium to cure ink deposited on the printing medium, wherein said curing unit is an infrared system or a hot air blowing unit (FIG. 1, elements 124, 126; column 8, lines 62-64: Heating by forced hot air is preferred, although other heat sources, such as infrared heaters can be used).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus (as modified) to include a curing unit to cure ink deposited on the printing medium as disclosed by Codos. The motivation for doing so would have been to cure the ink upon its contacting the substrate (printing medium) to prevent ink spreading and wicking that affect printing quality as taught by Codos (column 2, lines 65-67).

6. Claims 12 and 23 lack an inventive step under PCT Article 33(3) as being obvious over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claims 1 and 22, and further in view of Rasmussen et al. (US 6536894).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above except an ironing unit located above each said printing table assembly and arranged to iron media on said printing table assemblies.

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Rasmussen et al. discloses an ink jet printing apparatus including an ink jet printhead (FIG. 2B, element 14) for forming images on a printing medium conveyed by a conveyor (32) and an ironing unit located above said printing medium and arranged to iron said printing media before printing thereon (FIG. 2B, elements 201', 202; column 3, lines 32-38: Heating and pressing the print media upstream of printing to flatten print media prior to ink jet printing thereon).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus (as modified) to include an ironing unit located above the printing medium to iron the printing media before printing as disclosed by Rasmussen et al. The motivation for doing so would have been to provide a flat and stable media for printing in order to improve image quality as taught by Rasmussen et al. (column 4, lines 19-24).

7. Claims 4-5 lack an inventive step under PCT Article 33(3) as being obvious over Iwatsuki et al. (US 2003/0197772 A1) in view of Morita et al. (US 6879378), as applied to claim 1, and further in view of Nakamura et al. (US 2003/0142167 A1).

Iwatsuki et al., as modified, discloses the claimed invention as discussed above except wherein said linear motion X axis stage is a linear motor driven stage and said linear motion Y axis stage is a linear motor driven stage.

Nakamura et al. discloses an ink jet printing apparatus comprising a linear motion X axis stage (FIG. 9, elements 19, 52-53) to convey an ink jet printhead (FIG. 9, element 22) to form images on a printing medium (FIG. 9, element 12) positioned on a printing table (FIG. 9, element 49) conveyed by a linear motion Y axis stage (FIG. 9, elements 21, 54, 56), wherein both X and Y linear motion stages are linear motor driven stages (paragraphs [0103]-[0104]: An X slider/stage 53 contains a linear motor. A Y slider/stage 56 contains a linear motor. The X and Y sliders move when the associated built-in linear motor is operated).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify Iwatsuki et al.'s printing apparatus (as modified) to move/drive the stages by linear motors as disclosed by Nakamura et al. The motivation for doing so would have been because it is possible to control a position of the ink jet head supported by the X stage and a position of the printing table supported by the Y stage very precisely as taught by Nakamura (paragraph [0105]).

8.	Claims 1-81 meet the criteria set out iin PCT Article 33(4) and thus the claims meet industrial applicability	because the
	bject matter claimed can be made or used in industry.	